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ABSTRACT

The development of a nutrition curriculum to be integrated in other subjects in the elementary schools is discussed. The planned curriculum is intended to be developed in such a way that nutrition concepts can be introduced in the context of established subject matter areas such as reading, mathematics, social studies, and health. The concepts introduced initially are to be elaborated and expanded as the child progresses through the school system. A nucleus of educators well versed in educational methodology, curriculum planning and development, and learning theory collaborated with nutrition scientists and nutrition educators to identify the nutrition concepts to be taught. The recommendations issued by this collaborating group are set forth in this report. (JD)

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LEARNER OBJECTIVES IDENTIFIED BY NUTRITION EDUCATORS

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In 1974 under the impetus of a grant from the Nutrition Foundation, the Nutrition Program at Penn State began developing a nutrition curriculum, "Nutrition in a Changing World", to be integrated in other subject matter areas in the elementary schools. This was but one aspect of the program which also focused on nutrition education for the general public through informal channels such as public television and a nutrition information and resource center and formal education in college for the general college student, the teacher, the health professional and the medical student. Although much of the development in these other areas was supportive of and integral to the school curriculum, our discussion here will be confined to the process by which we established a curriculum for K-6.

Following rather extensive discussions among educators, specialists in early childhood development and nutritionists, agreement was reached on a certain set of assumptions to govern our approach. First the curriculum would be developed in such a way that nutrition concepts would be introduced in the context of established subject matter areas such as reading, mathematics, social studies and health. It would not require allocation of special time in an already crowded curriculum for yet another subject matter emphasis. Second, since the teacher now in the system has in only rare instances, a background in nutrition adequate to allow her to cope with student questions, the curriculum itself would be written to provide the teacher with a level of nutrition knowledge to function at at least minimum competency with some sense of confidence. The availability of an in-service program involving various levels of commitment was essential for the more motivated

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teachers. Similarly appropriate courses must be available in the colleges of education so that the cadre of teachers in the system now will be able to handle nutrition concepts in the classroom. Third, any curriculum would be based on concepts identified by nutritionists working with the public in a wide variety of settings as appropriate goals for a comprehensive school curriculum. Fourth, the concepts introduced initially would be elaborated and expanded as the child progressed throughout the system. Lastly, while some of the nutrition information would be communicated through food and food related experiences, the major emphases would be on nutrients--making the curriculum essentially nutrient-based rather than food-based. Additionally it was recognized that as nutrition issues changed over time, there would be need for a constant up-dating.

The initial step in curriculum development was to assemble a nucleus of educators well versed in educational methodology, curriculum planning and developmental and learning theory to collaborate with nutrition scientists and nutrition educators qualified to identify the nutrition concepts to be taught. Early discussions led to the decision that in contrast to many existing curricula which had sought input from parents and teachers, the content could best be determined by nutrition professionals. These people were considered most capable of identifying the knowledge base which a high school graduate would need to function as a nutritionally literate decision maker in a constantly changing market place. The challenges to prepare students to assess the baffling array of seemingly conflicting messages from politicians, food marketing inputs, nutritionists, pseudo-nutritionists and health professionals was an overriding consideration.

Thus, it was with a clearly defined objective of developing a curriculum which would provide the emerging high school graduate with the set of knowledge and skills needed to think, feel and perform as an informed consumer of nutrition information that this core of professionals formulated a set of 15 skills, knowledge and attitude areas considered crucial to this objective. This subset cross-checked for completeness against a grid representing biological and social concerns at both the micro and macro level.

TABLE I

<u>Unit</u>	<u>Micro Level</u>	<u>Macro Level</u>
Biological	Microbiological unit: physiological aspects of nutrition in the individual	Macrobiological unit: sociological & psychological aspects of nutrition for the individual
Social	Microsocial unit: nutrition issues relating to the family or living unit	Macrosocial unit: food and nutrition issues relating to communities

From this an expanded list of 87 project learner objectives (PLO's) were derived. After extensive editing and modification to assure that they represented real-world, situational objectives which met the five general criteria questions, they were validated by several groups of professionals.

TABLE II

Five General Criteria Questions Developed

1. Why do we need nutrients?
2. What nutrients do we need and how much?
3. How do we get our nutrients?
4. How do our nutritional needs change?
5. How do we study nutrition?

The list was reduced first to 54 items based on priority judgments of 60 independent nutrition and education professionals and finally to 40 items after an analysis of responses of 52 members of dietetic and school food service associations was used to eliminate items which high standard deviations, low item-total score correlations.

In an effort to be assured that these 40 project learner objectives (PLO's) represented a consensus of an even broader sampling of nutritionists a stratified random sample of 1000 members of the Society for Nutrition Education was asked to assign a priority to each item. Respondents were drawn from nutritionists in teaching, counseling, research, food service, public health and communications. Each ranked the priority of each of the 40 items on a Likert scale of a low of one to a high of seven. Following a principal components analysis and a plot of eigenvalue to determine the probably number of factors a varimax rotation was used to determine the factor structure and the item loadings in each factor.

The analysis of the 599 responses representative of the total sample showed a high internal consistency (alpha index of reliability = 0.9) and a low inter-item correlation which indicated that items were measuring different nutrition curriculum objectives. Of all 40 items four had a mean priority score of 6.0 or more on a Likert scale of 1 to 7. These included:

1. Analyze one's own nutrition and food patterns, identify problems, if any, and initiate action to correct these problems.
2. Describe the relationship between nutrition and health.
3. Be able to explain why the inclusion of a variety of foods in the diet is desirable.
4. Critically evaluate food and nutrition claims on a logical and nutritionally informed basis.

All others but five had a score of 4.2 or above confirming that those items which had survived the original screening were indeed those considered by nutritionists as an important basis for a curriculum.

A varimax rotation of an eight factor solution which accounted for 55% of the total variance provided eight factors each with at least three items with a factor loading of 0.50 or above indicating that there were several consistent themes generally recognized by the respondents. The components of each factor were judged to provide a rationale for naming the factor. The results of this are shown in Table III.

TABLE III

Factors Identified in Eight Factor Solutions

Social and cultural aspects of food choice and use.

Planning nutritionally adequate meals.

Relationship of nutrition and health.

Application of scientific and practical information in food choice decisions.

Identification and solution of global nutrition-related problems.

Solution of family and community nutrition-related problems.

Nutrition as a career.

Food, nutrients and bodily functions.

As an example of the individual items loading on a particular factor, the items which are components with loading of 0.5 or above of the first factor -- **social** and cultural aspects of food choice and use are shown in Table IV.

TABLE IV

Social and Cultural Aspects of Food Choice and Use

List several ways in which food influences social interaction.

Identify those situations in which food is used as an object of expressive behavior.

Report which aesthetic and sensory qualities influence the selection of different foods by different individuals.

Compare the eating patterns and habits of different families and suggest possible factors which may be related to the differences.

The factor with the highest priority ranking was factor III identified as "Relationship of Nutrition and Health" which included four items shown in Table V.

TABLE V

Relationship of Nutrition and Health

Describe the relationship between nutrition and health.

Be able to explain why the inclusion of a variety of foods in the diet is desirable.

Identify the role of food and nutrients in different stages of the life cycle and problems common to these stages.

Analyze one's own nutrition and food patterns, identify problems if any, and initiate action to correct these problems.

The eleven items which failed to meet the criteria of a loading of 0.50 or higher were grouped in a miscellaneous category. These items were concerned with a wide range of issues including food costs, cultural food patterns, environmental factors affecting food quality and nutrition. Many of these had higher priority scores than those which fell into discrete factors and represented important elements to be included in the curriculum.

The results of this factor analysis which represented the thinking of a large number of nutrition educators in business, education, communications and food service provided much of the conceptual framework for the curriculum development. Concerns about developmental readiness, sequencing across various academic areas and the assessment of needs were dealt with in other team activities.

While there was general agreement that the ideal teacher would have a strong basis in nutrition principles and their application in order to utilize a nutrition curriculum with confidence and with creativity, pragmatic considerations dictated that the curriculum be designed in such a way that the teacher be shown how to access available resources should he/she lack formal preparation in nutrition. In order to deal with situations where teachers sought or were encouraged to seek formal preparation to teach nutrition effectively, efforts have been directed simultaneously to packaging courses to meet the needs of educators at three levels. In the minimum package, a half-hour videotape cassette and outlines of activities by which the instructor guides the teacher through a series of techniques of how-to-teach nutrition in the classroom. A second level of sophistication combines the how-to-teach package with an introductory level college course taught using self-instructional materials and four videotapes and a third level with a slightly more advanced approach to handling nutritional principles.

The process by which these learner objectives were used as a basis for the curriculum context will be described in the following paper.

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